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developed thoracic crests, and that some flowers which are especially favorites with them have long, exserted, ascending stamens and styles (*e. g. Echium vulgare* and *Lonicera Periclymenum*). If the stamens in these plants were short, the pollen would have little chance of being brushed off by the thorax of the moth, and it does not readily adhere (as the sticky pollen masses of the orchids do) to the haustellum, and if the thorax of the moth were smooth the pollen would not be so liable to be brushed off, even though the stamens are exserted ; whereas with exserted and ascending stamens in the flower and crested thorax in the moth, we have every condition necessary to insure a greater or less quantity of pollen being conveyed from one plant to another. In the *Labiatae* the stamens, though so few, seem to be especially arranged in many species, so that every chance may be afforded of pollen being carried. In *Ajuga reptans* and *Teucrium Scorodonia* the stamens are exserted and ascending, and are four in number — two long and two shorter. An insect therefore in plunging its head into the corolla would almost necessarily brush all the four stamens. These plants are much visited by moths.—*Journal of Botany*.

RELICS OF A HOMESTEAD OF THE STONE AGE.

BY CHARLES C. ABBOTT, M.D.

THE interest that centres in every isolated arrow point or rude stone axe that we chance to come upon, as it is lying in the field — the train of thought that such relics excite in every intelligent observer, absorbing as it is, pales into a commonplace occurrence, when we happen to meet with a series of stone implements of many forms, that epitomize, in their individual and collective characters, the habits, and occupations of their Stone Age owners ; and to a far greater extent is this the case, when these collected relics are seen lying in the very spot where their ancient owners left them : the corn-mill and its crushing-stones by the hearth, still black with ashes ; the hatchet near by, that was used to split the marrow bones of animals ; the polished horn-stone skinning knife, and skin dressers ; and back from the fire-place, in separate piles, the battle axe, spears and arrows of each inmate of that household.

In about such positions, each rude relic telling its own story as plainly as ever do the contents of a carefully opened grave, we lately had the good fortune to find a "deposit" of stone implements, numbering in all, about one hundred and seventy specimens.

The discovery of this deposit was made on the removal of the brow or face of a low bluff, and filling up of a shallow valley, that a more level road might be run through the property. A little brook, almost dry in summer, rippled through the valley; which stream was no doubt of much greater volume when the aborigines dwelt upon its banks.

The relics of this "find" were met with in a circumscribed spot of about thirty feet in diameter, and some twenty inches below the surface of the ground. The floor of this "homestead," as we have called it, was very hard and compact; the soil being of a darker color than the superincumbent earth, and well mixed with small oval gravel stones, of a noticeably uniform size. At one side of the nearly circular spot was a well defined fire-place, marked by a circle of oval white stones, six to eight inches in length, and half that in thickness. Within this circle was a layer of ashes and charcoal, seven inches deep in the centre, and three at the margin of the fire-place. This coal and ash deposit showed, on careful examination, a considerable percentage of minute fragments of mussel shell, and of small fragments of bones, too much splintered to identify, but apparently the long bones of wading birds and of the larger fishes.

Of the stone implements, the most noticeable specimen, on account of size, was the large "corn-mill;" a heavy quartzite (?) stone, some fifteen inches in length by ten in width. It was lying in a shallow depression in the floor of the homestead, at the right hand side of the fire-place, and within a foot of the row of white stones that marked that feature of the "find." The mill had but a slight depression on its upper surface, not a quarter of an inch deep, yet clearly traceable on examination, and had evidently been but little used. Lying near it, were two crushing stones, one of which was undoubtedly used in connection with the "mill." It is a flat, nearly circular pebble, about four and one-half inches in diameter. One surface is merely levelled off, by constant rubbing, rather than pecked first and then ground. The opposite side has been pecked over the greater part of its surface, and the centre of the levelled surface has been somewhat hollowed

out, and is smoother than the surrounding merely hammered portion. Associated with the above was a globular quartz pebble, three inches in diameter, that may have been used in connection with the "mill," instead of the crusher we have described; or, in first breaking the hard grains of corn the pebble may have been used, and the flat stone then used to reduce the cracked corn to meal.

Mr. Evans figures (*Anc. Stone Impl. G. B.* p. 224, fig. 169) a "hammer stone," in size and shape identical with that we have described; and on pages 232-4 describes, under the name of "querns," grain mills, that are in every respect identical, except that as a class they may be larger and more elaborate in finish.

Near the mill and its accompanying stones, just described, we found four "net-weights" as they are usually called. One was a globular pebble, with a shallow depression about it, that was roughly and very irregularly pecked. Another was a flattened pebble, with a notch well defined at each side; being of the more abundant form of "sinkers," but much thicker than the other two specimens, and than the notched weights generally are. One of the two thin, flat specimens was of more interest than these specimens usually are, in that there were three well defined notches. It is not easy to determine the use of this third notch.

Near the sinkers were five rudely chipped implements. (?) or more probably failures. While exhibiting abundant traces of having been worked by man, it is doubtful if they were ever put to any use. Their general appearance was not that of cores, either, from which flakes had been struck; nor was there any trace of chipping having been carried on within the limits of the homestead we are now describing. A very rude implement is frequently found in this neighborhood, but on it a cutting edge is always a noticeable feature; but in these there was nothing that could be called a cutting edge, except at one part of the larger of the five specimens.

On referring to illustrations of "drift" implements in Mr. Evans' work above quoted, and to "*Reliquiæ Aquitanicæ*," we find many so-called implements fully as rude as the least finished of the five above mentioned. What gives to these a peculiar interest, however, is not their similarity to the "drift implements" of Europe, but their association with some of the very finest wrought stone implements and arrowheads. It is a puzzle to know what the fash-

ioners of these latter could want, or do, with what, at best, are merely broken stones.

There were also three well marked hammer stones of the common pattern. Flat, oval pebbles, well battered at the ends, and side depressions for the thumb and second finger, the forefinger being curled over the hammering end *not in use*; as both extremities show that they have been each well used. These hammer stones are identical in form with those found in Great Britain, as will be seen on reference to Mr. Evans' work, pages 214-20.

There was also found with these hammers, half of a very pretty hone, which long usage has worn down to very smooth surfaces. The specimen, if broken in halves, has been about five inches long, and is one and one-quarter inches in length, by scant half an inch in thickness. The two sides are both perfectly level to within a short distance of the edge, when they slope off at a slight angle.

Hones of this character, and others with curved sharpening or polishing surfaces, are met with on the surface, where the commoner forms of relics are found, but they are not abundant.

There were also two cylindrical stones, of a pestle-like appearance, that were, of course, brought by the former occupants of this camp or homestead, to the enclosure we are describing, but whether used as pestles or selected for polishing stones, but never used, it is very hard to decide; and with these may be mentioned a curiously worn pebble that has much the appearance of having been commenced for a polished skinning knife, and never completed. As the superincumbent earth was purely a vegetable mould, and contained no pebbles, it is not likely that either this or the "pestles" got within the "find," and became associated with the unquestionable relics, by mere accident.

One naturally expects to find those chipped flints that are universally known as "scrapers," in every considerable "find" of stone implements; nor were they here wanting; two specimens of unquestionable scrapers being found, and an allied form of chipped jasper, that seems to be a connecting link, as it were, between scrapers and lance-heads; the specimen has the appearance of having been commenced for a spear and, injured for that purpose by an unlucky blow, subsequently chipped into its present shape and made to answer as a scraper.

The two genuine scrapers that were found, are of unusual interest, in being strictly of the European form, and not in any way

similar to the elaborately chipped jaspers, that are so abundant on the surface, and which are believed also to have been scrapers.

The two scrapers found measure about three inches in length, by one and three-quarters in breadth. They are irregularly oval, with the under surface, in each case, being nearly the plane of a single cleavage. They are both chipped from the same block or core of stone, a bluish grey jasper, of which many of the finest arrowheads were made.

The larger of the two scrapers bears a remarkable resemblance to a Bridlington scraper, figured in Mr. Evans' work, page 276; fig. 218; but is about double the size.

An implement was found near the scrapers, that we will next refer to, before noticing the weapons proper; the specimen being a finely polished skinning knife, of more than ordinary beauty of finish. This fine "celt," as it would be called in England, measures but three inches and one-quarter in length, and has a cutting edge a trace over an inch in extent. The surface generally is polished; but most care has been taken with the cutting qualities of the instrument, and the edge and sides adjoining it have received a polish that we have never seen excelled in any stone implement. The material looks like a conglomerate of quartz and agate.

The only other domestic implement was a rough gouge, made of serpentine and with the edge well preserved. The specimen measures seven inches in length; the edge and a distance therefrom of about one and one-half inches is entire and this portion is quite well polished, while the remainder apparently never has been. The edge, which is very slightly curved, measures one and one-half inches in width; the corners of the blade being protected by a narrow ridge, which gradually widens as it recedes from the cutting edge.

Nothing further of a domestic nature was found, or indeed, was present on the spot; for most thorough search was made, under very favorable circumstances; but opposite the fire-place, in what appeared to have been three separate heaps which were unfortunately mixed together in uncovering them, was a fine series of arrow and spear points, and one or two chipped jasper specimens, similar to, but not unquestionably lanceheads.

The arrowheads being the most prominent portion of this part of the "find," we will first give a hurried enumeration of their numbers and types. Mineralogically, this lot of arrowheads was

interesting, in showing a good deal more than usual variation in the materials used. The minerals being quartz, purple, yellow, and brown jasper, hornstone, slate, sandstone, and a peculiar conglomerate containing mica, not often met with in the shape of relics.

Considered in the matter of types, we found there were sixteen stemmed arrowpoints, of large size, excellent workmanship, and all of jasper, of the various colors in which this mineral occurs. Six of these specimens were barbed and stemmed, the others had simply a projecting tang. Four were flat, thin and sharply edged; the others mostly with a median ridge.

There was also a pretty, triangular arrowpoint, two and one-half inches long, and one and one-half inches wide at the base; and a quartz point that was pentagonal, approaching thus the leaf-shaped form, which was noticeably absent in this find.

The white quartz arrowpoints numbered forty-four specimens, and as a rule were small, and of less finish than specimens of this mineral are apt to be. Twenty-nine were stemmed; five were of the "lozenge" pattern, and ten were triangular specimens, these latter all having the concave base. Of the stemmed specimens only three had "notched bases."

Of what might be called common specimens, there were forty-eight that could be separated into six types, as follows: seven were lozenge-shaped points, and excellent examples of this form; ten were triangular points, four with concave bases, five with straight bases, and one with a convex base, being *almost* a leaf-shaped specimen; two were true leaf-shaped points; and one of this pattern, but stemmed also, being a form not often met with; ten were excellent *barbed* arrowpoints, that is, with the corners of the blade sharply pointed and making the base of the blade much wider than the stem; eleven specimens were of the "notched base" pattern, *i. e.* with a stem about as wide as the blade, and separated from it only by a semicircular notch or indentation; seven were plain stemmed points, a form that is not readily distinguished from the lozenge shape, as we recognize that pattern among the specimens gathered by us. Indeed, the plain stemmed arrowpoint graduates readily into the true leaf-shaped form.

Of spearheads there were but five specimens; two short stemmed examples, made of slate, and in no way noticeable. A third was of slate also, but much more carefully wrought, and a beautiful example of the "notched base" pattern. It measured four

inches, lacking an eighth, and was noticeable particularly for the median ridge running its whole length and from this ridge the specimen was very regularly bevelled to the sides. The notches at the base were large and deep, and the stem narrower than the base of the blade. The fourth example of the spearheads was like the preceding but about one third shorter. The remaining spearhead was more interesting, in that it nearly approached the true leaf-shaped pattern; a blunt barb-like widening at the base making it vary from that form a little, the stem or base itself being rounded.

Before noticing the collection of knives, as we propose calling a series of implements contained in this "find," we will briefly allude to three other specimens, that seem different in some respects from any of the above. One is a roughly chipped implement of agate, three inches in length, and a trace over two in greatest width. The base is blunt, being the natural surface of the pebble from which the specimen was chipped; the edges, although crooked, are sharp, and the point well defined and still acute. The specimen itself suggests a small lancehead, an unfinished knife, or a small hatchet, that might have been used to split long bones, that the marrow might be secured. It is much less finished and finely flaked than the jasper lanceheads we have so frequently met with on the surface and in graves. The second of these three specimens is a beautifully chipped jasper specimen, that appears to have been a long stemmed spear, which, being broken near the base, has had the fractured end carefully rechipped. As the specimen now is, it is a triangular "flint," two and five-eighths inches long, and one and one-half inches wide. It may be looked upon as a knife made from a spear, we suppose; inasmuch as so many, approaching it in character, were found at the same time. The third specimen is a rudely chipped oval knife (?) blade, noticeable as having been made of white quartz; a mineral not often used except for arrow-heads.

We have now to consider a remarkable series of hornstone implements, forty-two in number, which have much of interest connected with them. As a class, they may be said to approach the flint dagger blades figured by Mr. Evans, on page 315 of his work on the Stone Implements of Great Britain. They can be described as "chipped flints," with square bases, well defined points, and slightly convex sides, averaging three and one-half inches in length by one inch in breadth. Six of them have convex

bases, and consequently are leaf-shaped arrowpoints of a large size. In no one specimen is there any distinct notching of the sides, near the base, to facilitate the fastening of a handle; and for this reason we have thought that they may have been knives, rather than spearpoints or arrowpoints; but it is possible that they were intended as war arrowheads, and were to be only slightly inserted in the shaft; so that the person shot could not dislodge the stone point, by drawing the shaft from the wound. It seems almost useless to conjecture as to the particular use of these or indeed any specimens, which, from their shape and size, show that they may have been used for several different purposes.

A fact, fully as interesting as the presence of any or all of these relics, consists in the absence of two common forms of "Indian relics," namely: the ordinary grooved cobble-stone axe, and fragments of pottery; no specimen of the former or trace of the latter could be found anywhere about the limits of the beaten discolored ground that we have called a homestead.

Now arises the question, whence came the people who once occupied this spot, and left these abundant traces of their sojourn here? Marking the degree of civilization, or rather, of its absence, as estimated by these relics, does it, indeed, seem possible, as sketched by Haeckel,* that from hypothetical Lemuria, in the Indian ocean, a being worthy *then* to be called a man, could finally, after many ages, reach North-west America, and then cross our broad continent, to reach the Atlantic coast, in a state of advancement only equal to the production of such rude stone implements as we have described? We do not doubt the correctness of the theory of the evolution of man from creatures not men, but that the ancestors of the American red-skin lived nearer home than the Indian ocean, we cannot but think; and we fail, as yet to see, *how* "the dispute between the monogenists and the polygenists can die a silent and unobserved death;"† unless indeed it be by the final victory of the polygenetic school.

* Reproduced by Chapman in "Evolution of Life," p. 177.

† Descent of Man, vol. 1, p. 235. English edition.